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SYSTEMATIC STATUS OF DORMICE (RODENTIA: GLIRIDAE) FROM SOUTHERN CAMEROON, AFRICA

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ABSTRACT

The systematic status of dormice, genus *Graphiurus*, in southern Cameroon, Africa, is reviewed. From an analysis of measurements, morphological differences and geographic distributional data, five species are recognized in southern Cameroon—*Graphiurus crassicaudatus, G. hueti, G. christyi, G. lorraineus,* and *G. surdus*.

INTRODUCTION

The genus *Graphiurus* is widely distributed in sub-Saharan Africa. Because there are usually insufficient numbers of specimens from any one locality to adequately assess individual variation or the variability among populations, many names have been proposed within this genus. At present, many of these taxa are considered synonyms of *G. murinus* (Ellerman et al., 1953 and Genest-Villard, 1979). Recently, Genest-Villard (1979) published a systematic revision of *Graphiurus*. She recognized six species in the genus, with *G. murinus, G. crassi-*

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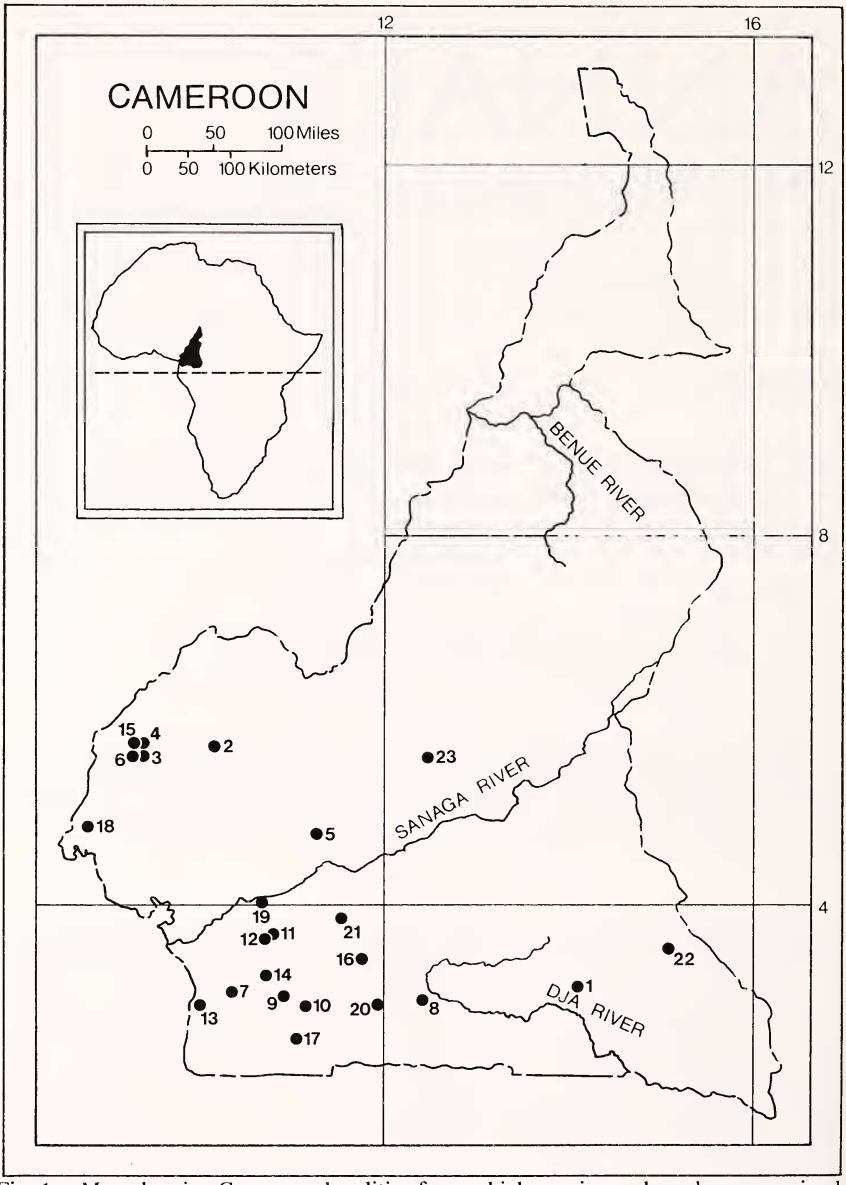


Fig. 1.—Map showing Cameroon localities from which specimens have been examined, arranged in alphabetical order as follows: 1) Assobam, 2) Babadjou, 3) Bachuntai, 4) Bashauo, 5) Bafia, 6) Besongabang, 7) Bipindi, 8) Bitye, 9) Efulen, 10) Ebolowa, 11) Eseka, 12) 8 km SW Eseka, 13) Kribi, 14) Lolodorf, 15) Mamfe, 16) Metet, 17) Meyo, 18) Ndian Estate, 19) Sakbayeme, 20) Sangmelima, 21) Yaounde, 22) Yokadouma, and 23) Yoko.

caudatus and *G. hueti* from the area represented by our study. Our objective is to evaluate the taxonomic status of the *Graphiurus* from the tropical forests of southern Cameroon.

We have examined a large number of specimens from a small geographic area in southern Cameroon (Fig. 1) and conclude five species are represented: *G. crassicaudatus* and *G. hueti,* currently recognized by most mammalogists as distinct species, and *G. christyi, G. lorraineus,* and *G. surdus.* The latter three taxa were formerly synonymized with *G. murinus,* but our studies indicate the presence of morphological differences warranting specific recognition.

METHODS AND MATERIALS

This study was based primarily on the examination of specimens in two collections from Cameroon, one made by A. I. Good between 1913 and 1948 and the other by L. W. Robbins in 1973 and 1974.

The specimens we examined are housed in the mammal collections of the American Museum of Natural History, New York (AMNH); British Museum (Natural History), London (BMNH); Carnegie Museum of Natural History, Pittsburgh (CM); Museum of Comparative Zoology, Harvard University, Cambridge (MCZ); and the National Museum of Natural History, Washington, DC (USNM).

Cranial measurements were taken to the nearest 0.1 mm with dial calipers. The 18 mensural characters used are listed in Table 1. Length of hind foot includes claws; height of rostrum was taken behind incisors. Univariate analysis of variance was computed by the UNIVAR program (Power, 1970).

All specimens used in the statistical comparisons are from areas in or near Cameroon. All examples of *Graphiurus lorraineus* are from southern Cameroon. Specimens of *G. christyi* from Zaire were included with the small sample from Cameroon after analysis indicated that they were not significantly different in most measurements. Most specimens of *G. surdus* are from southern Cameroon; however, two, including the holotype, are from Rio Muni. Specimens of *G. crassicaudatus* are from Cameroon except for the holotype of *G. c. dorotheae,* which is from Nigeria. The *G. hueti* are from Cameroon and include the holotype of *G. h. argenteus.* For comparative purposes, some additional samples were examined from other African countries. With the exception of a specimen of *G. murinus* from the Republic of South Africa (19 km S Aliwal North, USNM), these are listed under specimens examined in appropriate accounts.

Localities in Cameroon from which specimens were examined are shown in Fig. 1. Exact coordinates for these localities are listed, where known, in a gazetteer.

RESULTS

Graphiurus hueti, a West African species, is significantly larger in all characters examined than the other species studied. Crown breadth of molars was not measured in this species. *Graphiurus lorraineus* is separable from the other four species on the following cranial measurements: greatest length of skull; condylobasal length; greatest zygomatic breadth; interorbital breadth; breadth of braincase; length of palate. *Graphiurus surdus* is separable from all other species by condylobasal length. *Graphiurus crassicaudatus* is distinguishable on the basis of greatest zygomatic breadth and length of maxillary toothrow. *Graphiurus christyi* does not differ significantly in any one character

Table 1.—*Variation in external and cranial measurements in five species of Cameroon* Graphiurus.

Species	N	Mean ± 2 SE	Range	CV	SS-STP
		Total length			
Graphiurus hueti	15	261.0 ± 11.90	(205.0–287.0)	8.8	I
Graphiurus christyi	10	172.6 ± 6.85	(150.0–185.0)	6.3	I
Graphiurus surdus	4	172.3 ± 9.46	(160.0–183.0)	5.5	II
Graphiurus crassicaudatus	10	148.8 ± 4.22	(136.0–156.0)	4.5	II
Graphiurus lorraineus	33	146.2 ± 2.50	(129.0–158.0)	4.9	I
		Tail length			
Graphiurus hueti	15	118.1 ± 9.49	(84.0–142.0)	15.6	I
Graphiurus christyi	10	77.8 ± 8.19	(45.0–90.0)	16.6	I
Graphiurus surdus	5	70.0 ± 9.00	(56.0–82.0)	14.3	II
Graphiurus lorraineus	33	67.3 ± 2.23	(50.0–77.0)	9.5	II
Graphiurus crassicaudatus	10	56.5 ± 4.10	(45.0–70.0)	11.5	I
		Length of hind foot			
Graphiurus hueti	15	31.8 ± 0.31	(28.0–33.0)	3.7	I
Graphiurus surdus	7	20.9 ± 1.10	(18.0–22.0)	7.0	I
Graphiurus christyi	10	17.9 ± 0.63	(16.0–19.0)	5.6	I
Graphiurus lorraineus	27	17.6 ± 0.25	(16.0–19.0)	3.6	I
Graphiurus crassicaudatus	10	17.3 ± 0.95	(15.0–19.0)	8.6	I
		Length of ear			
Graphiurus hueti	7	21.4 ± 0.86	(20.0–23.0)	5.3	I
Graphiurus surdus	7	14.0 ± 1.07	(13.0–17.0)	10.1	I
Graphiurus christyi	7	13.9 ± 1.02	(12.0–15.0)	9.7	II
Graphiurus crassicaudatus	9	13.0 ± 0.67	(11.0–14.0)	7.7	II
Graphiurus lorraineus	12	12.3 ± 0.56	(11.0–14.0)	7.9	I
		Greatest length of skull			
Graphiurus hueti	14	38.2 ± 0.58	(36.5–39.7)	2.8	I
Graphiurus surdus	7	28.0 ± 0.86	(26.5–29.7)	4.1	I
Graphiurus christyi	12	27.4 ± 0.36	(26.8–28.9)	2.3	II
Graphiurus crassicaudatus	8	26.3 ± 0.59	(25.3–27.9)	3.1	I
Graphiurus lorraineus	30	24.3 ± 0.29	(22.4–25.6)	3.2	I
		Condylobasal length			
Graphiurus hueti	13	35.4 ± 0.49	(33.6–36.7)	2.5	I
Graphiurus surdus	7	25.8 ± 0.83	(24.1–27.2)	4.3	I
Graphiurus christyi	12	24.2 ± 0.61	(22.8–25.7)	3.1	I
Graphiurus crassicaudatus	8	24.1 ± 0.25	(19.5–22.9)	3.4	I
Graphiurus lorraineus	36	21.6 ± 0.25	(19.5–22.9)	3.4	I
		Zygomatic breadth			
Graphiurus hueti	15	21.8 ± 0.37	(20.6–22.8)	3.2	I
Graphiurus crassicaudatus	5	15.9 ± 0.43	(15.4–16.4)	3.0	I
Graphiurus surdus	8	14.7 ± 0.36	(14.1–15.7)	3.5	I
Graphiurus christyi	8	14.6 ± 0.39	(14.0–15.6)	3.8	I
Graphiurus lorraineus	19	13.7 ± 0.30	(12.7–14.9)	4.7	I

Table 1.—*Continued.*

Species	N	Mean ± 2 SE	Range	CV	SS-STP
		Interorbital breadth			
Graphiurus hueti	17	6.1 ± 0.13	(5.7–6.6)	4.5	I
Graphiurus crassicaudatus	10	5.0 ± 0.13	(4.7–5.3)	4.2	I
Graphiurus christyi	13	4.8 ± 0.09	(4.5–5.1)	3.5	II
Graphiurus surdus	10	4.7 ± 0.12	(4.3–5.0)	4.1	I
Graphiurus lorraineus	49	4.3 ± 0.04	(4.0–4.7)	3.3	I
		Breadth of braincase			
Graphiurus hueti	16	16.1 ± 0.20	(15.6–16.8)	2.5	I
Graphiurus crassicaudatus	7	12.9 ± 0.21	(12.4–13.3)	2.1	I
Graphiurus surdus	7	12.4 ± 0.27	(11.9–12.8)	2.9	II
Graphiurus christyi	12	12.2 ± 0.09	(12.0–12.5)	1.3	I
Graphiurus lorraineus	34	11.5 ± 0.10	(10.8–12.1)	2.6	I
		Greatest length of nasals			
Graphiurus hueti	17	14.6 ± 0.26	(13.6–15.3)	3.7	I
Graphiurus surdus	9	10.7 ± 0.30	(9.9–11.3)	4.1	I
Graphiurus christyi	13	10.3 ± 0.22	(9.8–11.2)	3.8	I
Graphiurus lorraineus	44	9.1 ± 0.10	(8.3–9.9)	3.7	I
Graphiurus crassicaudatus	10	8.7 ± 0.34	(8.2–9.8)	6.1	I
		Length of anterior palatine foramen			
Graphiurus hueti	17	3.0 ± 0.14	(2.5–3.4)	9.6	I
Graphiurus crassicaudatus	8	2.5 ± 0.18	(2.3–3.0)	9.9	I
Graphiurus surdus	8	2.5 ± 0.11	(2.3–2.8)	6.5	I
Graphiurus christyi	13	2.5 ± 0.14	(2.0–2.9)	10.2	I
Graphiurus lorraineus	48	2.4 ± 0.07	(2.5–3.4)	9.7	I
		Length of maxillary toothrow			
Graphiurus hueti	17	5.1 ± 0.05	(4.9–5.3)	2.2	I
Graphiurus crassicaudatus	9	3.7 ± 0.07	(3.6–3.9)	2.9	I
Graphiurus surdus	8	3.1 ± 0.19	(2.8–3.9)	9.8	I
Graphiurus christyi	9	3.1 ± 0.07	(3.0–3.3)	3.7	II
Graphiurus lorraineus	40	3.0 ± 0.04	(2.7–3.4)	4.3	I
		Crown breadth of molars (M^2-M^2)			
Graphiurus crassicaudatus	9	5.8 ± 0.12	(5.6–6.1)	3.2	I
Graphiurus christyi	9	5.6 ± 0.08	(5.4–5.8)	2.1	II
Graphiurus surdus	8	5.4 ± 0.10	(5.4–5.7)	2.6	II
Graphiurus lorraineus	40	5.2 ± 0.05	(4.9–5.5)	3.3	I
		Length of bulla			
Graphiurus hueti	17	8.1 ± 0.17	(7.6–8.9)	4.4	I
Graphiurus surdus	7	7.4 ± 0.16	(7.1–7.7)	2.9	I
Graphiurus christyi	13	7.0 ± 0.31	(5.9–7.9)	7.9	II
Graphiurus lorraineus	41	6.7 ± 0.07	(6.2–7.3)	3.3	II
Graphiurus crassicaudatus	8	6.4 ± 0.15	(6.2–6.8)	3.4	I

Table 1.—*Continued.*

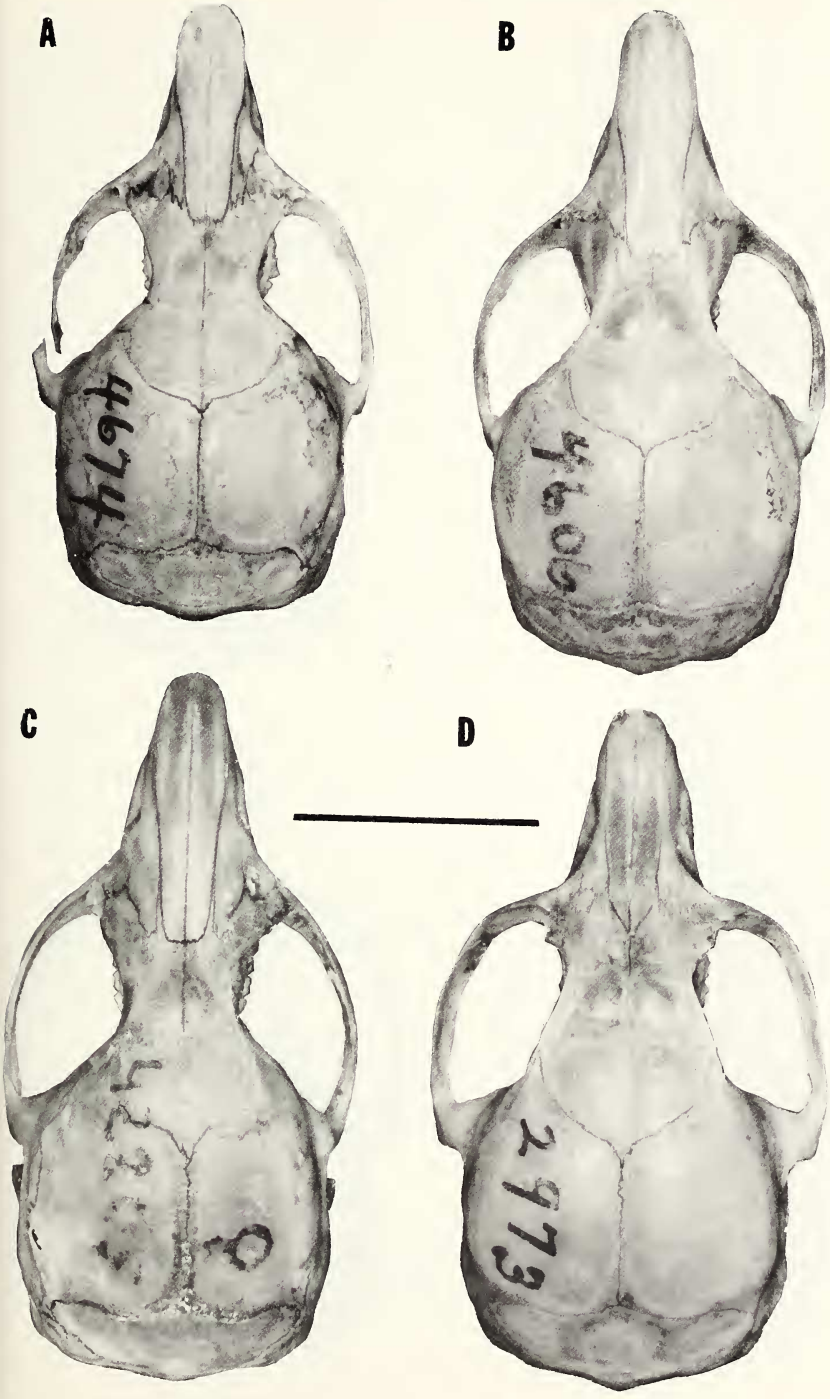
Species	N	Mean ± 2 SE	Range	CV	SS-STP
		Breadth of bulla			
Graphiurus hueti	17	7.0 ± 0.15	(6.6–7.5)	4.3	I
Graphiurus crassicaudatus	8	5.7 ± 0.15	(5.6–6.0)	3.6	I
Graphiurus surdus	7	5.6 ± 0.10	(5.4–5.8)	2.4	II
Graphiurus christyi	13	5.4 ± 0.18	(5.0–6.1)	6.1	II
Graphiurus lorraineus	42	5.2 ± 0.06	(4.8–5.6)	3.4	I
		Length of palate			
Graphiurus hueti	13	16.1 ± 0.32	(14.9–17.0)	3.6	I
Graphiurus surdus	7	11.4 ± 0.35	(10.5–11.9)	4.1	I
Graphiurus crassicaudatus	6	10.9 ± 0.21	(10.5–11.2)	2.4	II
Graphiurus christyi	11	10.3 ± 0.39	(8.9–11.3)	6.2	I
Graphiurus lorraineus	37	9.6 ± 0.17	(8.7–11.0)	5.3	I
		Height of skull			
Graphiurus hueti	16	14.5 ± 0.35	(13.5–15.3)	4.8	I
Graphiurus surdus	7	10.8 ± 0.24	(10.3–11.3)	3.0	I
Graphiurus christyi	12	10.7 ± 0.20	(10.0–11.2)	3.2	I
Graphiurus crassicaudatus	8	10.4 ± 0.20	(10.2–11.0)	2.7	II
Graphiurus lorraineus	34	10.0 ± 0.09	(9.2–10.6)	2.6	I
		Height of rostrum			
Graphiurus hueti	17	7.1 ± 0.17	(6.5–7.6)	5.0	I
Graphiurus christyi	13	5.4 ± 0.16	(5.0–6.0)	5.5	I
Graphiurus crassicaudatus	10	5.3 ± 0.27	(4.8–6.0)	8.0	I
Graphiurus surdus	9	4.8 ± 0.12	(4.3–5.1)	5.6	I
Graphiurus lorraineus	44	4.5 ± 0.06	(4.1–5.0)	4.8	I

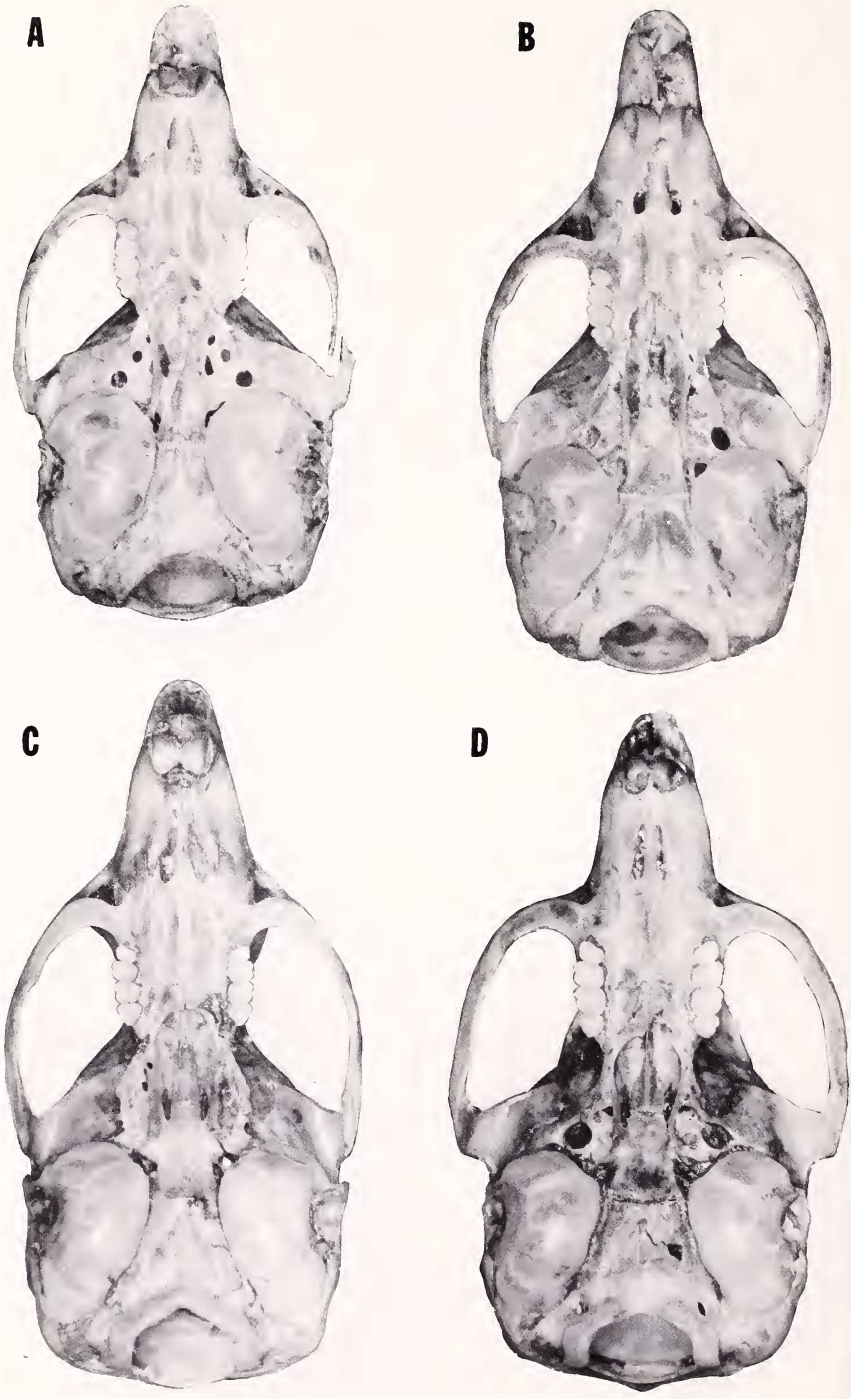
from the other species; specimens of it, however, can be separated from those of *G. surdus* by condylobasal length, length of palate, and height of rostrum; from *G. crassicaudatus* by greatest zygomatic breadth, breadth of braincase, length of nasals, length of maxillary toothrow, length of auditory bulla, and breadth of auditory bulla; and from examples of *G. lorraineus* by greatest length of skull, condylobasal length, breadth of braincase, greatest length of nasals, crown breadth of molars, and height of skull.

External measurements were not used in these comparisons because of inconsistencies among preparators. However, they are included in Table 1 to indicate relative external dimensions of each species.

→

Fig. 2.—Dorsal view of skulls of four species of *Graphiurus* from Cameroon. A. *G. lorraineus*, CM 4674; B. *G. christyi*, CM 4606; C. *G. surdus*, CM 42205; D. *G. crassicaudatus*, CM 2973. Scale: black line equals 10 mm.


A
B
C
D


A
B
C
D

Non-mensural differences can be seen by comparing the cranial photographs (Figs. 2–4). *Graphiurus christyi* is characterized by the anterior development and projection of the premaxillaries and nasals beyond the anterior surface of the incisors (Figs. 3B and 4B). *Graphiurus crassicaudatus* can be distinguished cranially from other similar-sized *Graphiurus* by the increased development of the supraorbital ridges and the straight, rather than rounded, edge of the posterior portion of the interorbital region, the straight ventral edge of the distal portion of the nasals (Fig. 4D), and by the position of the P^4 near the anterior root of the zygomatic arch (Fig. 3D). The skull of *G. lorraineus* is short, with a relatively shortened rostrum and small cheekteeth (Figs. 2A, 3A and 4A). The skull of *G. surdus* is long and narrow, with an elongated rostrum and lengthened braincase (Figs. 2C, 3C, and 4C).

The following key to the forest dwelling species of *Graphiurus* found in Cameroon incorporates characters that were found to be helpful in separating these taxa. It should be used cautiously when identifying specimens from other parts of Africa.

KEY TO THE CAMEROON FOREST SPECIES OF *GRAPHIURUS*

External

1. Head and body length:	120 mm or greater	*G. hueti*
	less than 120 mm	2
2. Distinct and complete eye ring		3
Not as above		4
3. Hair on belly with pale gray or white tips		*G. lorraineus*
Not as above		*G. christyi*
4. Hind foot (with claws) 21–22, tail hairs white tipped		*G. surdus*
Hind foot (with claws) 17–19 or under, tail not as above and usually shorter (under 65) and broader		*G. crassicaudatus*

Cranial

1. Greatest skull length:	more than 35.0 mm	*G. hueti*
	less than 35 mm	2

←
Fig. 3.—Ventral view of skulls of four species of *Graphiurus* from Cameroon. A. *G. lorraineus*, CM 4674; B. *G. christyi*, CM 4606; C. *G. surdus*, CM 42205; D. *G. crassicaudatus*, CM 2973. Scale is same as in Fig. 2.

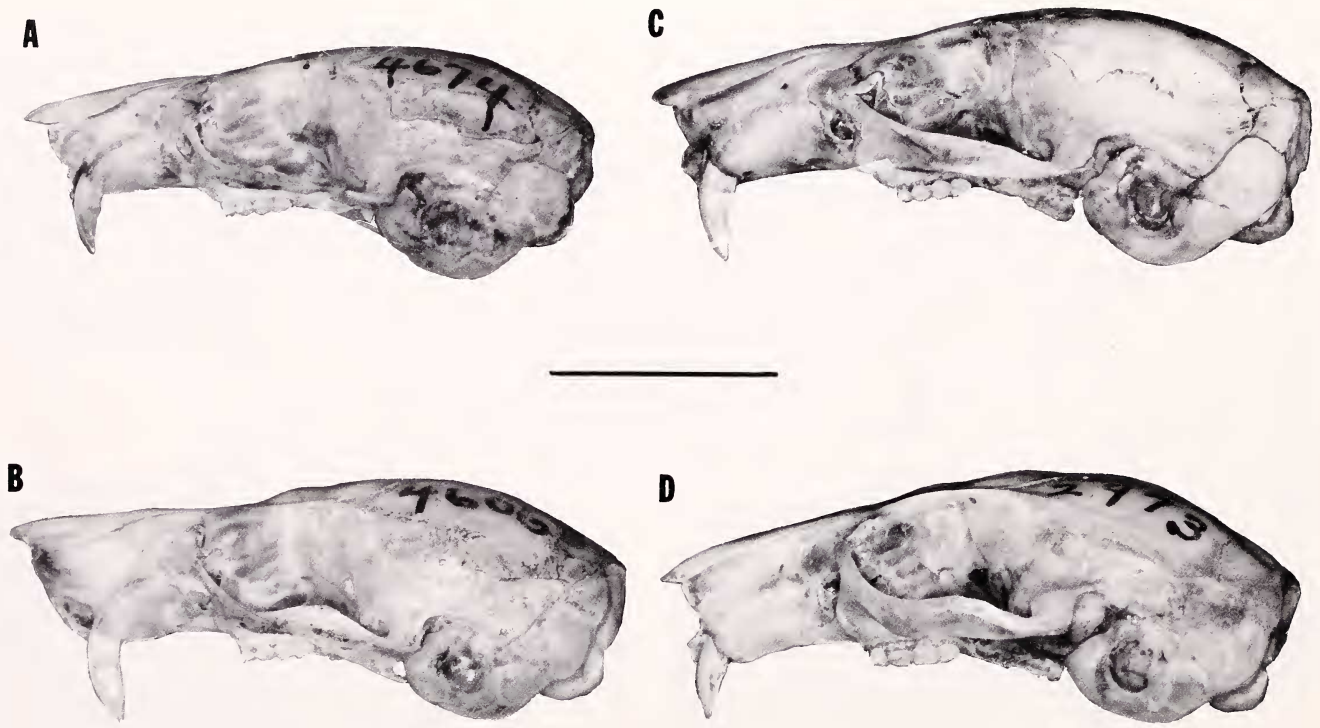


Fig. 4.—Lateral view of skulls of four species of *Graphiurus* from Cameroon. A. *G. lorraineus*, CM 4674; B. *G. christyi*, CM 4606; C. *G. surdus*, CM 42205; D. *G. crassicaudatus*, CM 2973. Scale: black line equals 10 mm.

2. Maxillary toothrow:	3.7–3.9	*G. crassicaudatus*
	2.8–3.2	3
3. Height of rostrum:	5.7–6.0	*G. christyi*
	4.1–5.1	4
4. Condylobasal length:	24.7–25.5	*G. surdus*
	20.0–23.0	
	(Some individuals from northern savanna may measure up to 25.0, but qualitative characters are distinctive).	*G. lorraineus*

DISCUSSION

Our interpretation of the systematic relationships of western African *Graphiurus* differs appreciably from the revision of *Graphiurus* by Genest-Villard (1979). *Graphiurus crassicaudatus* is clearly a distinct species and, although widespread in the forest block of West Africa, seems to be locally uncommon. The largest species, *Graphiurus hueti,* is restricted to the forest block, and is common, especially in hollow trees within the forest block.

In the course of this study, we have examined numerous specimens from throughout the range of *Graphiurus*. Our examination of *G. hueti* revealed little variation in the species throughout West Africa. From this we doubt that *Graphiurus monardi* (St. Leger, 1936) from Angola and Zambia is a subspecies of *G. hueti,* as suggested by Genest-Villard (1979), when morphological and ecological differences between the two taxa are considered. Ansell (1978) considered *G. monardi* as a distinct species in Zambia.

Within the widespread *Graphiurus murinus* species complex, Genest-Villard (1979) recognized two species—*G. parvus* (True, 1893) and *G. murinus* (Desmarest, 1822). She listed the former with two subspecies; the nominate one ranges from Ethiopia southward in East Africa to Zimbabwe and Malawi. A second, *G. p. brockmani* (Dollman 1910), occurs in Somalia and then in a zone from Niger, Nigeria, Mali, Ghana, Ivory Coast to Sierra Leone. We concur that there seems to be a small-sized taxon in the savanna zones of West Africa that is closely related to the forest inhabiting small dormice. The name *G. parvus* is one of the oldest names available for the dormice of the savanna zone. However, the taxonomic relationships of *G. foxi,* described from Kabwir, Nigeria, and *G. olga,* described from Asben, Niger, to the other small dormice in West Africa is still unclear.

Genest-Villard (1979) further distinguished *G. murinus* as a polytypic species including as synonyms all of the taxa described from the West African forest block. We are able to distinguish three species within this group in southern Cameroon. Genest-Villard (1979:409) list-

ed *G. christyi* Dollman, 1914, and *G. surdus* Dollman, 1912, as synonyms of *G. m. lorraineus* (Dollman, 1910). Our results show these two taxa to be distinct species. *Graphiurus spurrelli* (Dollman, 1912) considered by Genest-Villard (1979) to be a distinct subspecies of *G. murinus,* is indistinguishable from *G. lorraineus* and does not warrent subspecific status.

Few karyotypic data are available for any *Graphiurus*. For West Africa, Tranier and Dosso (1979) list a diploid number of 40 for a female *G. hueti* from a non-specified locality in Ivory Coast. This specimen had 14 acrocentrics and 26 metacentrics and submetacentrics. A diploid number of 70 was given by these same authors for *G. murinus* but no other information or a locality was listed.

Conclusions

We recognize five species of dormice from Cameroon. Two, *G. hueti* and *G. crassicaudatus,* are generally confined to western Equatorial Africa. Three species, previously considered synonyms of *G. murinus,* are distinguished: *G. surdus,* a large species originally reported from Rio Muni; *G. christyi,* originally described from Zaire; *G. lorraineus,* the Cameroon representative of a geographically widespread species that ranges from West Africa as far south as Zambia. This latter species may be a commensal in villages in Cameroon.

Although the distinctness of the five species in southern Cameroon is apparent, a revision of the entire genus may show that one or more of the names we have used for these species are synonyms of earlier described taxa from other parts of Africa.

Accounts of Species

Graphiurus christyi Dollman, 1914

Graphiurus christyi Dollman, Revue Zool. Africain, 4:80; 25 July 1914.

Type locality.—Mambaka and Mambo (see Moreau et al., 1946), Belgian Congo (now Zaire).

Distribution.—Previously known only from eastern Zaire; now also from southern Cameroon.

Specimens examined (34).—Cameroon; Lolodorf (4 CM). Zaire; Avakubi (1 AMNH); Mambaka and Mambo (2 BMNH, the holotype and one paratype); Medje (1 USNM, 23 AMNH, 1 BMNH); Gambi, SE of Angu, Mobatti (1 BMNH); Niangara (1 AMNH).

Remarks.—We have referred our specimens from Cameroon to *G. christyi* on the basis of external and cranial measurements, shape of skull, and color of pelage. However, they differ from *G. christyi* from Zaire in the shape of the premaxilla, condylobasal length (those from Zaire being larger), and the height of the rostrum (those from Cam-

eroon being larger). The specimens from Cameroon also have longer and denser fur than do any of the small *Graphiurus* examined. The distance (1,900 km) between known localities of this species probably reflects the lack of collecting. If not, the specimens from Cameroon should be re-examined.

Descriptive, distributional, and ecological information for *G. christyi* from Zaire were summarized by Hatt (1940).

Graphiurus crassicaudatus (Jentink, 1888)

Claviglis crassicaudatus Jentink, Notes Leyden Mus., 10:41; April 1888.
Type locality.—Du Queah River, Liberia.
Graphiurus crassicaudatus dorotheae Dollman, Ann. Mag. Nat. Hist., ser. 8, 9:312; March 1912.
Type locality.—Oban District, Southern Nigeria (actually southeastern Nigeria).

Distribution.—Liberia, Ivory Coast, Ghana, Nigeria, Cameroon, and possibly Fernando Poo.

Specimens examined (24).—CAMEROON: Bashauo (1 BMNH); Bipindi (2 AMNH); Bitye (1 BMNH); Ebolowa (1 CM); Eseka (4 CM, 1 AMNH); 8 km SW Eseka (1 CM); Lolodorf (1 CM); Ndian Estate (3 BMNH). NIGERIA: Oban District (2 BMNH, including holotype of *G. c. dorotheae*); Ekuri Beach (1 BMNH); Umuahia, 400 ft (2 BMNH); Owerri (1 BMNH); Ilobi (2 BMNH). FERNANDO POO: no specific locality (1 BMNH).
Additional records.—Rumfi Hills (Eisentraut, 1973:80). Two specimens in the British Museum reported by Sanderson (1940) from Cameroon as *G. haedulus* from Bashauo (=Bachuo) and one as *G. spurrelli* (from Ekuri Beach) were reidentified by Rosevear (1969) as *G. crassicaudatus*. We concur with Rosevear; however, examination of the map of the Percy Sladen expedition (Sanderson, 1940) reveals that Ekuri Beach is now in Nigeria rather than in Cameroon. One specimen from Fernando Poo in the British Museum might have been collected on Cameroon Mountain according to Rosevear, 1969. Cabrera (1929) stated that *G. crassicaudatus* did not exist on the island of Fernando Poo.

Remarks.—This appears to be the only small dormouse from western and central Africa that has been recognized as a distinct species by all who have examined it. Jentink (1888) described the genus *Claviglis* (type species, *G. crassicaudatus*) based on the shape of the tail (club-shaped and not distichous). Dollman (1912), however, stated that Jentink's type had a regenerated club-shaped tail. This club-shaped or fanned-tip-of-tail condition is common in dormice that appear to have injured tails. Dollman's (1912) description of *G. crassicaudatus* is good, but his color and size criteria for distinguishing *G. c. dorotheae* from the nominate subspecies are unsatisfactory when additional specimens are compared. Dollman (1912) and Rosevear (1969) stated that comparison of cranial and external characters of *G. crassicaudatus* support a closer relationship to *G. hueti* than to the *G. murinus* group.

One specimen trapped in Eseka on 24 October 1973 (mammae: 0 pectoral, 2 pairs inguinal—4) contained two embryos. Other informa-

tion on *G. crassicaudatus* was summarized by Rosevear (1969). Specimens from the vicinity of Eseka were trapped in Sherman nonfolding aluminum live-traps set on vines and horizontal branches in secondary high forest. No hollow trees were seen in the immediate area. All traps were baited with the nut of the oil palm (*Elaeis*). Traps were in position for two or more weeks before dormice entered.

Graphiurus hueti (Rochebrune, 1883)

Aethoglis hueti Rochebrune, Actes Soc. Linn. de Bordeaux (4) 7:110; 1883.
Type locality.—Environs of St. Louis, Sorres, Senegal.
Aethoglis hueti argenteus G. M. Allen, J. Mamm., 17:293; 1936.
Type locality.—Lolodorf, Cameroon.

Distribution.—Senegal, Sierra Leone, Liberia, Ivory Coast, Ghana, Nigeria, Cameroon, Central African Republic, and Gabon.

Specimens examined (35).—CAMEROON: Bachuntai (1 BMNH); Bashauo (4 BMNH); Besongabang (3 BMNH); Bipindi (2 BMNH); Efulen (2 BMNH); 8 km SW Eseka (5 CM); Lolodorf (7 CM, 1 MCZ, the holotype of *G. h. argenteus*); Mamfe (1 BMNH); Metet (1 MCZ); Sangmelima (8 CM).
Additional records.—Malende (Eisentraut, 1963); Eshobi (Sanderson, 1940); Ngam (Perret and Aellen, 1956).

Remarks.—There are questions regarding the validity of the subspecies. *Graphiurus hueti argenteus* is the subspecies of Cameroon and the Central Africa Republic; Allen (1936) described this subspecies as being drabber in color of pelage than the nominate taxon and as having whitish-tipped rather than gray hairs on the venter. We agree with Rosevear (1969) that color varies too much within populations to be used as the sole criterion for taxonomic separation. There is, however, a consistent size difference; specimens from Cameroon are larger in most measurements than those from western portions of the range.

One specimen obtained 8 km SW Eseka on 21 February 1974 contained two embryos and another obtained at the same locality on 7 April 1974 was lactating. Other information on the natural history of this species was summarized by Rosevear (1969). The specimens from 8 km SW Eseka were trapped in Sherman non-folding aluminum live-traps set on vines in secondary high forest, and were taken near hollow trees. Traps were baited with the nut of the oil palm (*Elaeis*) and were in place for more than one week before any dormice entered.

Graphiurus lorraineus Dollman, 1910

Graphiurus lorraineus Dollman, Ann. Mag. Nat. Hist., ser. 8, 5:284; March 1910.
Type locality.—Molegbe, south of Setema Rapids, Welle River, Belgian Congo (now Zaire).
Graphiurus spurrelli Dollman, Ann. Mag. Nat. Hist., ser. 8, 8:315; March 1912.
Type locality.—Bibianaha, 60 mi W Kumasi, Gold Coast (now Ghana).

Graphiurus haedulus Dollman, Ann. Mag. Nat. Hist., ser. 8, 9:316; March 1912.
Type locality.—Assobam, Bumba River, Cameroon.
Graphiurus schwabi G. M. Allen, Bull. Mus. Comp. Zool., 54:441; April 1912.
Type locality.—Kribi, Cameroon.

Distribution.—Sierra Leone, Liberia, Ivory Coast, Ghana, Nigeria, Cameroon, Rio Muni, Gabon, and Zaire; probably also southern Central African Republic, Republic of the Congo, northern Angola, and northern Zambia. Distribution may be limited to tropical forests.

Specimens examined (120).—CAMEROON: Assobam, Bumba River, 200 ft (1 BMNH, the holotype of *G. haedulus*); Babadjou (5 CM); Bafia (2 CM); Bitye (3 BMNH) Ebolowa (2 CM); Kribi (1 AMNH, 5 MCZ, including the holotype of *G. schwabi*); Lolodorf (31 CM, 4 MCZ); Metet (4 CM, 3 MCZ); Osundan (1 MCZ); Sakbayeme (1 MCZ); Sangmelima (5 CM); Yaounde (1 CM); Yokadouma (1 CM); Yoko (2 CM). GABON: Mityic (1 BMNH). GHANA: Bibianaha, 60 mi Kumasi (1 BMNH, the holotype of *G. spurrelli*); Kade (1 USNM); Bulima (1 USNM). IVORY COAST: Kahin (3 USNM). NIGERIA: Jos Plateau, Panyam Fish Farm (9 USNM). ZAIRE: Bafwabaka (2 AMNH); Faradji (2 AMNH); Lukolela (4 AMNH); Luluabourg (13 AMNH); Medje (2 AMNH); Molegbwe, Welle River (1 BMNH, the holotype of *G. lorraineus*); Niangara (4 AMNH); Vankerckhovenville (1 AMNH). ZAMBIA: Balovale (3 AMNH).

Remarks.—Hatt (1940) stated that *G. haedulus* and *G. spurrelli* were most likely subspecies of *G. lorraineus*. Ellerman et al. (1953), Rosevear (1969), Eisentraut (1973), and Genest-Villard (1979) regarded *G. lorraineus* as a subspecies of *G. murinus* (Desmarest, 1822). Examination of specimens of these taxa, as well as of *G. murinus* from South Africa, leads us to agree with Hatt. Specimens from the mountains (Eisentraut, 1963, 1973) and the savannas of Cameroon (Bafia, Babadjou, and Yoko) are larger and more variable in color than the forest species. The measurements of some of these specimens more nearly approach those of *G. murinus* from South Africa than those of *G. lorraineus*.

Graphius lorraineus frequently is found in thatch-roofed houses in the forested region of southern Cameroon (Good, 1947). Hatt (1940) and Rosevear (1969) provided ecological information on this species.

Graphiurus surdus Dollman, 1912

Graphiurus surdus Dollman, Ann. Mag. Nat. Hist., ser. 8, 9:314; March 1912.
Type locality.—Benito River, French Congo (now in Rio Muni).

Distribution.—Rio Muni and southern Cameroon.

Specimens examined (12).—CAMEROON: Bitye (1 BMNH); Efulen-Kribi (1 AMNH); Eseka (6 CM, 1 AMNH). RIO MUNI: Benito River (3 BMNH, including holotype).

Remarks.—Allen (1939) placed *G. schwabi* in synonomy with *G. haedulus*, but Perret and Aellen (1956) stated that *G. schwabi* was probably a synonym of *G. surdus* rather than of *G. haedulus*. Both

CAMEROON GAZETTEER

Locality	Coordinates	Species recorded
Assobam	3°15N, 14°02E	*G. lorraineus*
Babadjou	5°45N, 10°12E	*G. lorraineus*
Bachuntai	5°40N, 9°26E	*G. hueti*
Bashauo (=Bachuo)	5°45N, 9°26E	*G. crassicaudatus, G. hueti*
Bafia	4°40N, 11°05E	*G. lorraineus*
Besongabang	5°44N, 9°17E	*G. hueti*
Bipindi	3°06N, 10°30E	*G. crassicaudatus, G. hueti*
Bitye	3°10N, 12°20E	*G. crassicaudatus, G. lorraineus, G. surdus*
Efulen	2°46N, 10°42E	*G. hueti, G. surdus*
Ebolowa	2°56N, 11°11E	*G. crassicaudatus, G. lorraineus*
Eseka	3°38N, 10°47E	*G. crassicaudatus, G. surdus*
Eseka, 8 km SW	3°35N, 10°44E	*G. crassicaudatus, G. hueti*
Kribi	2°55N, 9°54E	*G. lorraineus, G. surdus*
Lolodorf	3°14N, 10°48E	*G. crassicaudatus, G. hueti, G. christyi, G. lorraineus*
Mamfe	5°46N, 9°17E	*G. hueti*
Metet	3°23N, 11°43E	*G. hueti, G. lorraineus*
Meyo	2°25N, 11°14E	*G. surdus*
Ndian Estate	4°54N, 8°54E	*G. crassicaudatus*
Osundan	not found	*G. lorraineus*
Sakbayeme	4°02N, 10°34E	*G. lorraineus*
Sangmelima	2°56N, 11°58E	*G. hueti, G. lorraineus*
Yaounde	3°51N, 11°31E	*G. lorraineus*
Yokadouma	3°25N, 15°08E	*G. lorraineus*
Yoko	5°29N, 12°19E	*G. lorraineus*

G. surdus and *G. schwabi* were originally described as having small ears (9 and 7 mm, respectively). However, external measurements of *G. surdus* were taken from fluid preserved specimens, whereas those of *G. schwabi* were from a dried skin originally preserved in formalin. The ears of our specimens measured 12 to 14 mm. A specimen (not seen by us) from Meyo reported as *G. surdus* by Perret and Aellen (1956) had short ears (9 mm), but does not correspond to *G. surdus* in cranial measurements.

Graphiurus surdus has a long and narrow skull with a short maxillary toothrow and short depth of rostrum. Examination of specimens from Rio Muni and southern Cameroon indicates that *G. surdus* is a species distinct from *G. haedulus* and *G. schwabi*; the latter two taxa are synonyms of *G. lorraineus*.

One female from Eseka contained two embryos on 14 January 1974 (mammae: 1 pair pectoral, 2 pairs inguinal = 6). The specimens from Eseka were taken in the same trapline as *G. crassicaudatus*.

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